Fermilab

Fermi National Accelerator Laboratory

Technical Division-Machine Shop

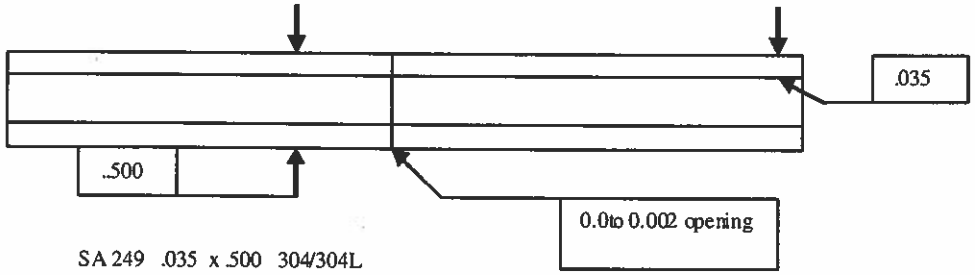
Welding Procedure Specification

Welding Procedure Specification No.:	Fermi WPS Cajon Orbital 002		**Date: 12/28/2010****
Revision No.:	**Revision Date:**	**Remarks:**	**Supporting PQR No.(s):**
Welding Processes:	GTAW/Automatic	(2)	**Cajon/Orbital PQR 002**
(Manual, Automatic, Machine, Semi-automatic)			

Joints (QW-402):

Joint Design: Groove	**Backing:** Gas	**Backing Material (Type):** Argon Gas	**Remainder:**
Retainer: Yes *** No	**Type:** Non-Metallic *** Metallic (Non-fusing)		

Joint Details:



SA 249 .035 x .500 304/304L

Cajon Orbital Welding Machine (Autogenous only)

Base Metals (QW403):	P-No.: 8 Group 1		TO	P-No.: 8 Group 1	
Specification Type and Grade: SA249 Type 304/304L					
TO Specification Type and Grade: SA249 Type 304/304L					
OR Chemical Analysis and Mechanical Properties:					
TO Chemical Analysis and Mechanical properties:					
Thickness Range:	**Process 1**			**Process 2**	
Base Metal:	Groove: .035	Fillet: Unlimited		Groove:	Fillet:
Deposited Weld Metal:	Groove: .035	Fillet: Unlimited		Groove:	Fillet:
Pipe Diameter Range:	Groove: .500 Minimum	Fillet: Unlimited		Groove:	Fillet:
Other:					

Filler Metals (QW-404)	Process 1		Process 2	
Specification No. (SFA):	Autogenous – No Filler			
AWS No, (Class):				
F-No.:				
A No.:	8			
Size of Filler Metals:				
Deposited Weld Metal Thickness Range:	Groove:	Fillet: Unlimited	Groove:	Fillet:
Electrode-Flux (Class):				
Flux Trade Name:				
Consumable Insert:				
Other:				

Each Base Metal-Filler Metal Combination should be recorded individually

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Positions (QW-405)		Post Heat Treatment (QW-407)	
Positions of Groove:	All	Temperature Range:	None
Welding Progression	Upward & downward	Time Range	N/A
Positions of Fillet	All		

Preheat (QW-408)		Gas (QW-408)			
Preheat Temperature:	Minimum 50° F			% Composition	
Interpass Temperature:	Maximum-Not Recorded		Gases	Mixture	Flow Rate
Preheat Maintenance:	None	Shielding	Argon	99.9%	10-15 CFH
Minimum Welding Temperature	32° F	Trailing	None	***	***
		Backing	Argon	99.9%	8-12 CFH

Electrical Characteristics (QW-409)				
Current – AC or DC:	Direct Current	Polarity: Straight	Characteristics	Pulsing
Tungsten Electrode:	Size: .040Ø	EWCe-2	Use factory shaped and sized electrode	
Mode of Metal Transfer for GMAW:	N/A			
Electrode Wire Feed Speed Range:	N/A			

Technique (QW-410)	
String or Weave Bead:	String
Orifice or Gas Cup Size:	Cajon Model 100D-5H head
Initial Interpass Cleaning (Brushing, Grinding, etc.):	Initial Solvent Clean***Wire brush between passes
Method of Back Gouging:	None
Oscillation: None	
Contact Tube to Work Distance:	N/A
Multiple or Single Pass (per side):	Single
Multiple or Single Electrode(s):	Single
Travel Speed (Range):	As Required
Peening:	None
Other:	

Sequence Chart: Cajon Welding Systems for .035 x ½ Ø SA249 Type 304/304L

Impulse	Maintenance	Frequency	Duty Cycle		Start	Duration	
52.9	**14.8**	**13**	**27**		**40**	**15**	

Pre-purge	Dwell	Down-slope	Post Purge		Speed		
10	**16**	**13**	**24**		**34**		

Special Notes		Gas Settings		
ARC Length	**.035**	Type	**Argon**	
Gage Setting	**.864**	Head	**12CFH**	
Material	**304/304L**	Tube	**10CFH**	
Wall Thickness	**.035**	Head Model	**5H**	Date:12/28/2009
Outside Diameter	**1/2Ø**	Power Supply	**100D**	Welder: Harbacek #8

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